

Remarks

This is responsive to the Office Action of April 21, 2005, in which, in a First Action, all of the 22 pending claims were finally rejected. Specifically, claims 1-6, 8, 10-15, 17 and 19-22 were rejected as being anticipated by Bass U.S. Patent No. 4,662,482 under 35 U.S.C. § 102(b), and claims 1, 2, 8-11 and 17-20 were rejected as being anticipated by Buell U.S. Patent No. 6,561,298 under 35 U.S.C. § 102(e). Also, claims 7 and 15 were rejected as being obvious over Bass under 35 U.S.C. § 103(a). From the context of the rejections, it appears that the latter rejection is intended to apply to claims 7 and 16, not claims 7 and 15. These rejections, with respect to the claims as amended, respectfully are traversed.

In particular, independent claims 1, 10 and 19 have been amended to include an element, *i.e.*, a drag ring, that previously was recited in dependent claims. Thus, no additional prior art search is required because presumably the searches previously conducted by the Examiner covered such element and the inclusion of such element in the independent claims raises no new issue of patentability. Also, by the present amendment, several typographical errors have been corrected. Accordingly, entry of the present amendment and reconsideration of the claims is appropriate under Rule 116.

The present invention is an improvement in mounting systems for disc brake rotors, and is particularly applicable to rotor mounting systems used in high performance automobiles. The disc brake rotors used in high performance automobiles are subjected to extreme stresses, applied both mechanically and thermally. The present invention accommodates such stresses by permitting the rotor to move axially and to expand and contract radially with respect to a wheel hub to which the rotor is connected, thus eliminating stress-induced deformation of the rotor as occurs when the rotor is fixedly mounted to the hub.

In particular, and as specified by the claims, a disc brake rotor is held by a plurality of alignment bushings that are mounted in and movable radially in slots in the rotor. The alignment bushings also are mounted on and slidable axially of a corresponding number of drive pins that are fixed to the wheel hub either directly or indirectly via an adapter. Further, a drag ring is

inserted between each alignment bushing and the associated drive pin and resists relative axial movement between the alignment bushing and drive pin. When the rotor is engaged by calipers during braking, the resistance of the drag ring may be overcome to move the alignment bushing axially relative to the associated drive pin to thereby move the rotor to a position in which the forces applied to its opposed sides by the calipers are balanced, thus self-aligning the rotor with respect to the calipers. When the calipers are released, the resistance provided by the drag ring maintains the relative axial positions of the alignment bushing and drive pin. This latter feature prevents uncontrolled axial oscillation, or "chattering," of the rotor as it rotates with the associated hub. Neither of the applied Bass and Buell patents discloses the claimed alignment bushing and drive pin arrangement of the present invention or the claimed drag ring and attendant self-alignment feature of the present invention.

Bass discloses a rotor mounting system for disc brakes on a motorcycle in which a rotor 10 is held by a plurality of spring steel "holders" 20. Holders 20 are held in place on the rim 13 of a motorcycle wheel 14 by bolts 17 and "spacer bushes" 18, with rotor 10 being movable axially of holders 20. Holders 20 include wings 22 and legs 25 and 26 which resiliently engage the sides of rotor 10 to hold it in a given position. During braking, the force applied by the calipers can move rotor 10 axially of holder 20, and when the calipers are released the rotor returns to its given position.

The Bass system does not include any element corresponding to the claimed alignment bushings of the present invention that are movable axially with the rotor. In the Bass structure, the holder 20 and spacer bush 18 are held in a fixed position against rim 13 by bolt 17. The alignment bushings of the present invention are slidably mounted in slots in the rotor and are movable axially with the rotor with respect to the drive pins and wheel hub. By this arrangement, the regions of the rotor in the vicinity of the slots are reinforced by the alignment bushings.

Further, there is no element in the Bass system corresponding to the claimed drag rings of the present invention. These rings, inserted between the alignment bushings and associated

drive pins, provide a self- alignment function by maintaining the axial position of the alignment bushings and rotor with respect to the drive pins and wheel hub, as determined by balancing the forces applied to the rotor by the calipers during braking. In the Bass system, the rotor must be moved axially with respect to the holder 20, spacer bush 18 and rim 13 each time the rotor is engaged by the calipers. This latter system results in more rotor and caliper wear than in the self-aligned system of the present invention.

Buell also discloses a disc brake rotor mounting system for motorcycles. This system includes a rotor 48 that is connected to wheel bosses 63 by fasteners 68, spacers 66 and washers 64. Spacers 66 on which rotor 48 is mounted are slightly longer than the thickness of the rotor, thereby permitting axial movement of the rotor when fasteners 68 are tightened against washers 64 and bosses 63. The system also includes springs 74 held in bosses 63 that bias rotor 48 axially outwardly away from the bosses. The stated purpose of springs 74 is to reduce noise caused by the rotor "bouncing" between the heads of the fasteners and the wheel bosses.

Like Bass, Buell has no element corresponding to the claimed alignment bushings and their rotor reinforcement feature. Also, Buell has no element corresponding to the claimed drag rings and their rotor self-alignment feature.

Thus, both Bass and Buell lack important elements of the claimed invention and the important functions performed by these elements, namely the claimed alignment bushings and drag rings and their respective functions. For these reasons, Applicant submits that the claims

as amended are clearly patentable over the references of record and should be allowed, which action respectfully is requested.

Respectfully submitted,

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